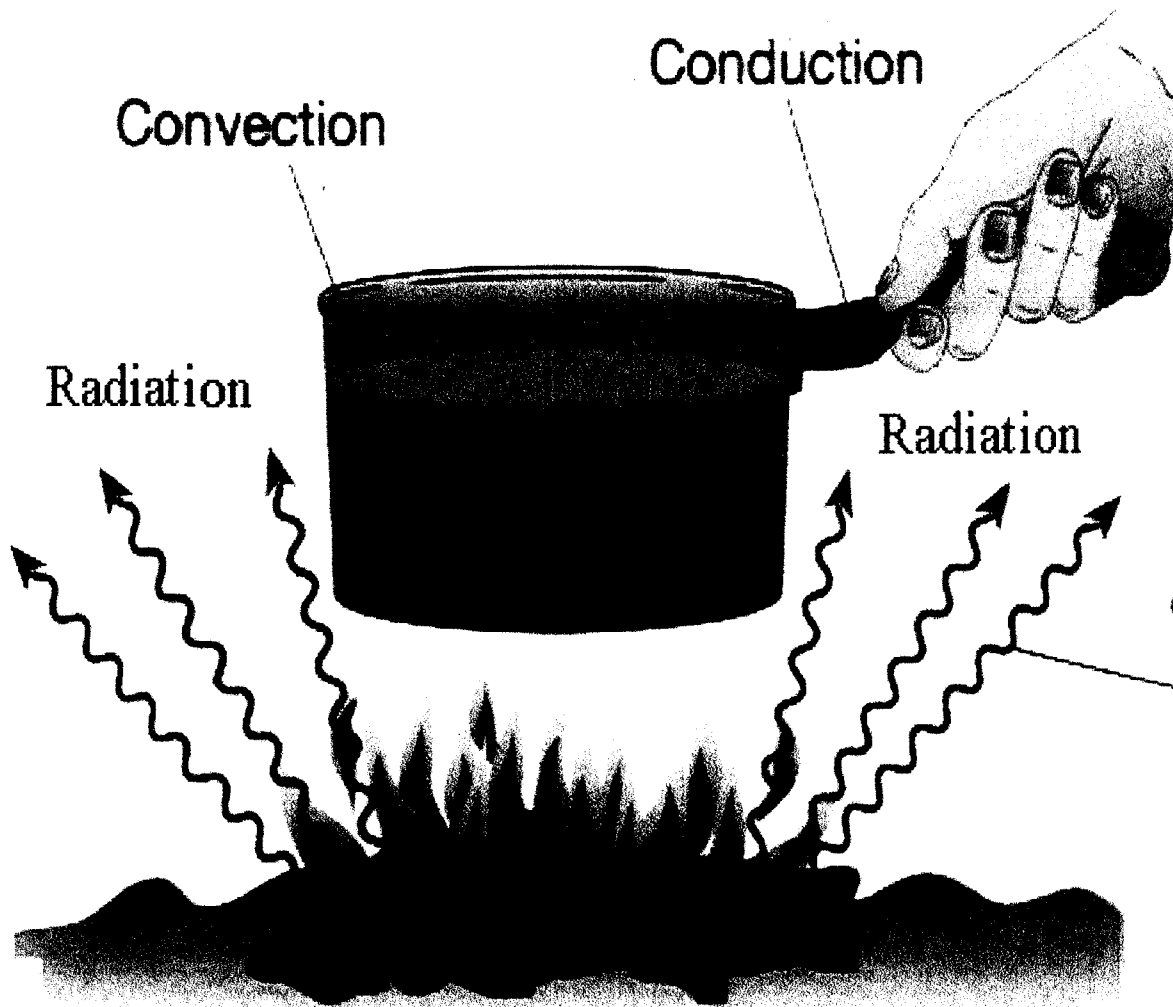


Temperature, Thermal Energy, and Heat

- **Matter has thermal energy due to the kinetic energy of its particles, which are in constant motion**
- **Temperature is a measure of the kinetic energy of particles**
- **Heat is the amount of thermal energy transferred**
- **Heat can be transferred by conduction, convection, and radiation**
- **Conduction is the transfer of heat due to direct contact of particles**
- **Convection is the transfer of heat with movement of fluid from one place to another**
- **Radiation is the transfer of energy by electromagnetic waves**

DIAGRAM

HEAT TRANSFER



Conduction: Directly contacting 2 surfaces movement from higher temperature to lower temperature

Convection: Heat transfer in fluids with density differences

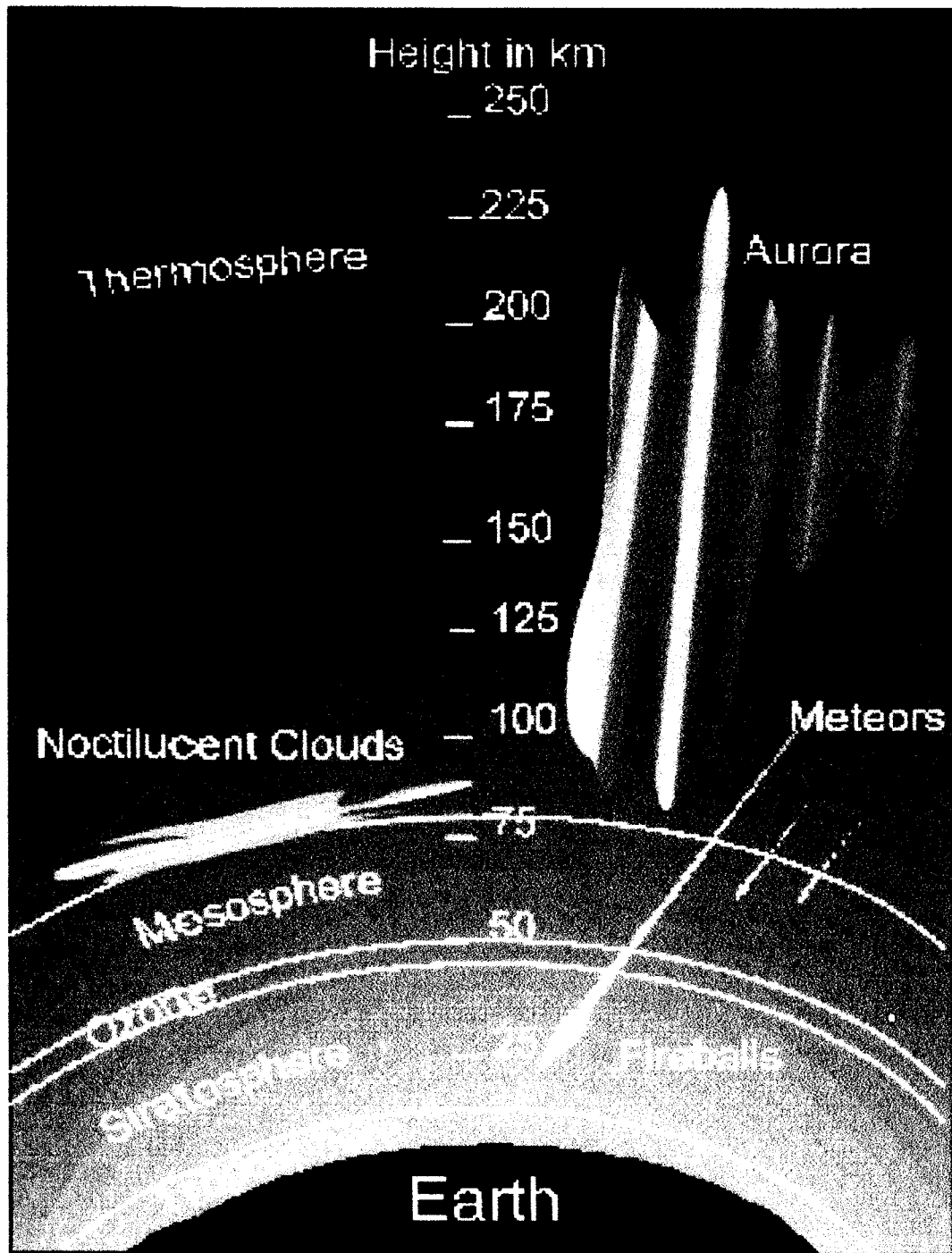
Radiation: Energy transfer in waves

Formation and Composition of the Atmosphere

- **Most of Earth's gases were originally emitted by volcanoes**
- **Earth's atmosphere is a complex system with four layers**
- **The lower layer, the troposphere, is composed mainly of nitrogen (78%), oxygen (21%) argon (.93%), and carbon dioxide (.04)%**
- **Plants and photosynthetic micro-organisms use sunlight and carbon dioxide to make sugar and oxygen**

DIAGRAM OF ATMOSPHERIC LAYERS

EARTH'S ATMOSPHERE

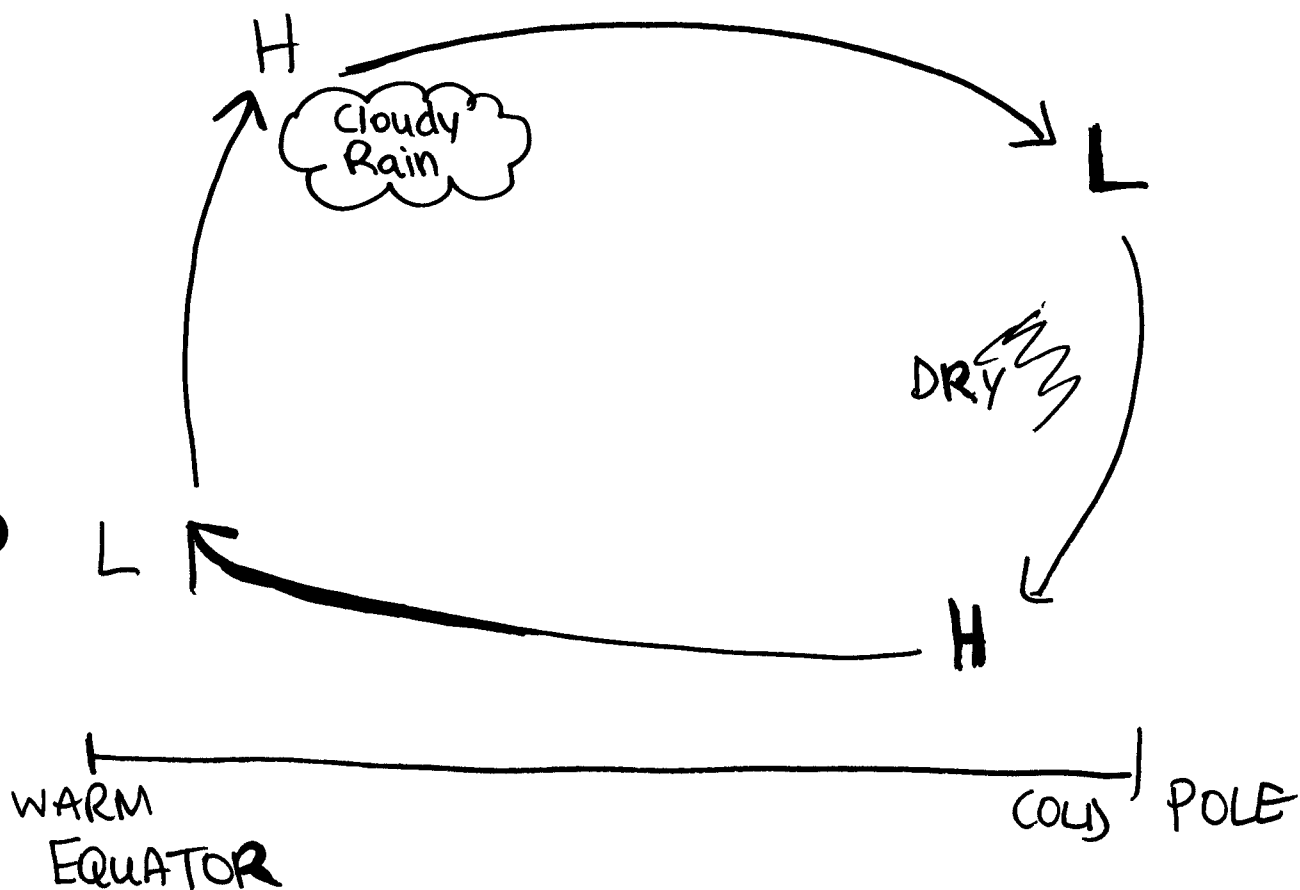


Energy Transfer in the Atmosphere

- Solar radiation transfers heat to the Earth, and conduction and convection transfer heat throughout the atmosphere
- Weather is the condition of the atmosphere at a specific time and place
- The Coriolis effect deflects winds due to Earth's rotation
- Differences in atmospheric pressure cause prevailing winds, local winds, and extreme weather

FLOW DIAGRAM OF ENERGY TRANSFER
WEATHER PATTERNS DIAGRAM

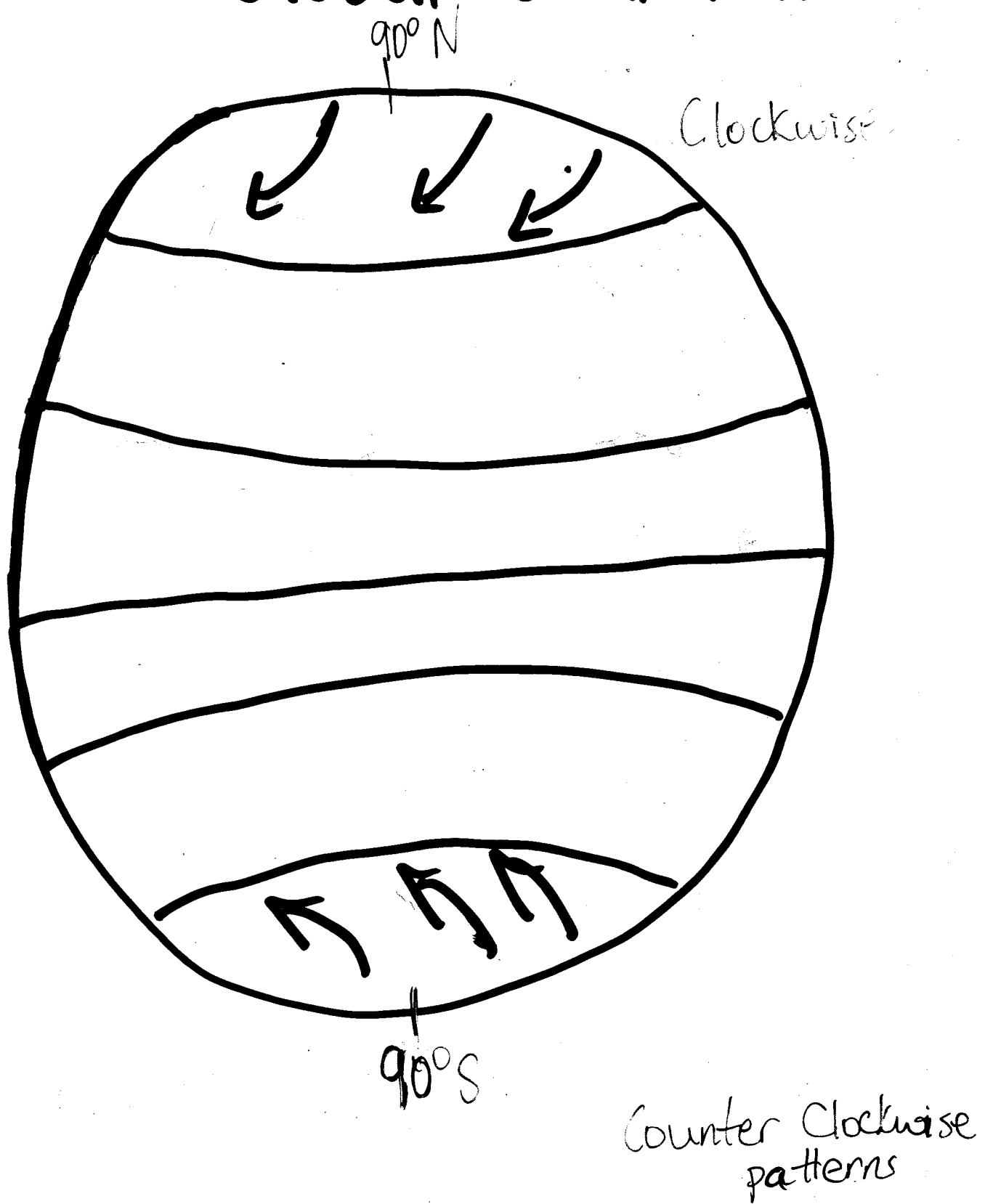
Earth's rotation makes circulation more complex



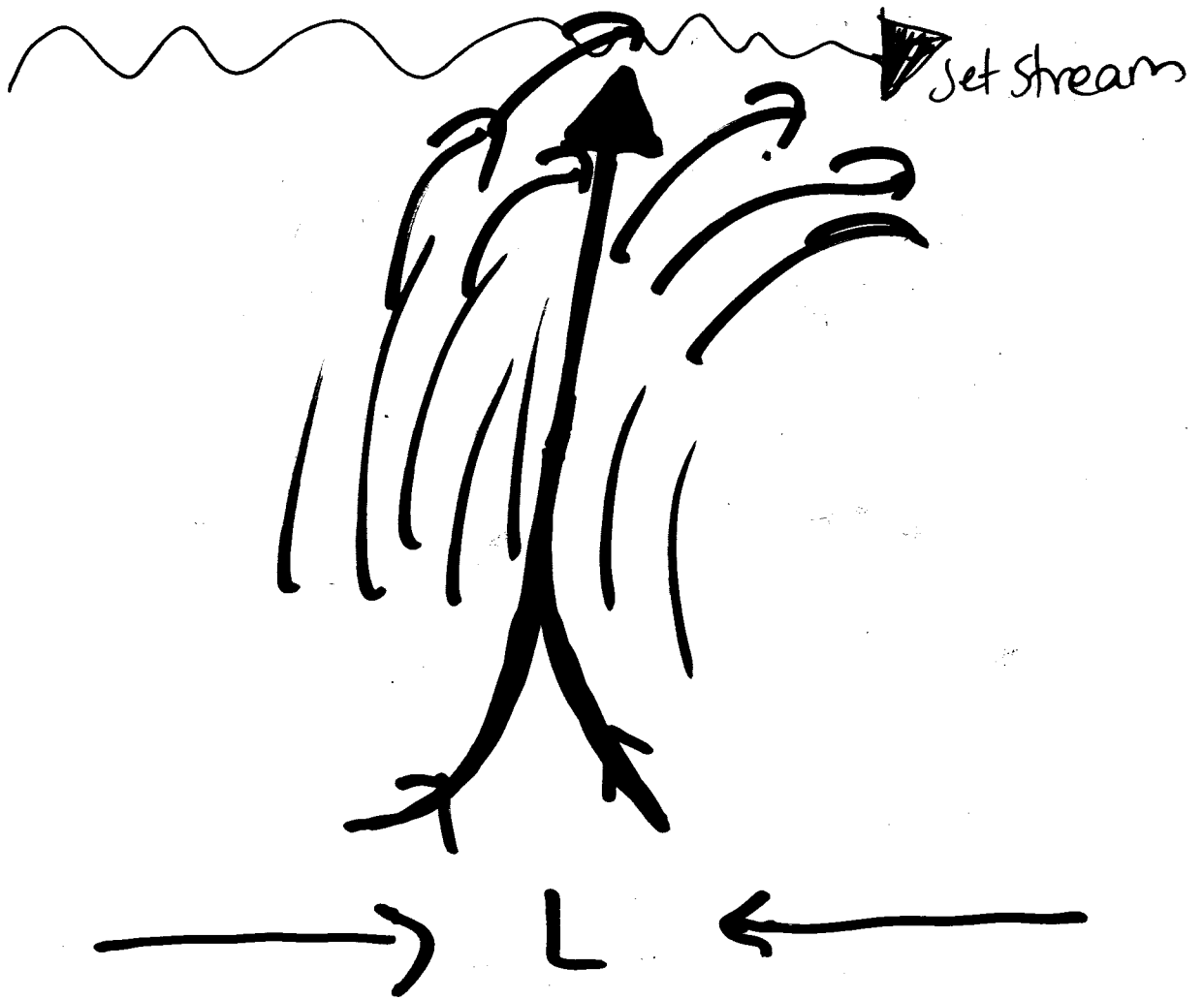
GLOBAL CIRCULATION
SYSTEM

Sun → thermal energy through radiation → radiation is absorbed by the ground → air above the ground is heated by conduction → heated air rises → thermal energy is transferred by convection → air moves to fill void → creates low pressure area.

Global Circulation

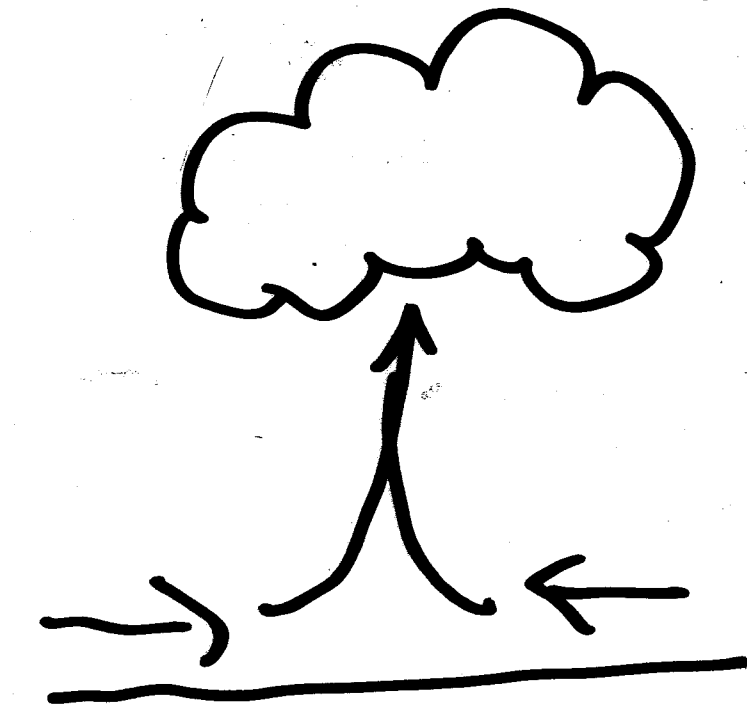


Jet Streams

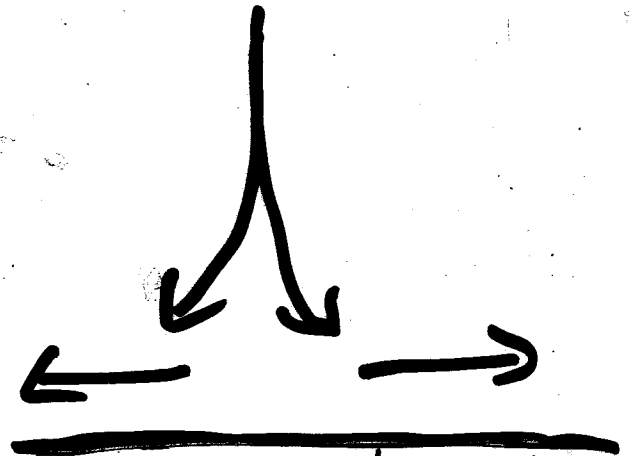


Helps pull air up and away

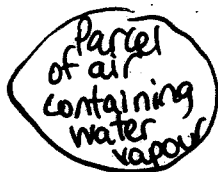
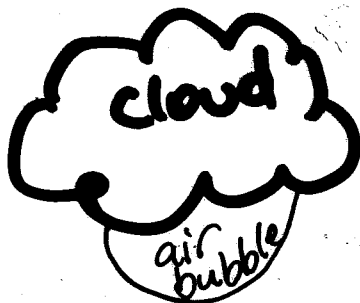
Pressure Systems



Air rises and cools to form clouds, in a Low press. sys
- moderate T°



H Air sinks in a high press. sys
- extreme T°



as air cools, water vapour will condense

air rises, as it ~~cools~~ does it cools

evaporation
* warm air rises as it is less dense but it also cools (expansion of air, less dense)